Late Blight Disease on Home Garden Tomatoes

This booklet contains answers to some common questions that home gardeners ask about tomato blight. For further advice or help in recognizing the disease, please contact a local garden centre or "Master Gardener" in your area.

Q ***What is tomato blight? What causes it?***

A When gardeners on the West Coast refer to "tomato blight", they usually mean the disease called "late blight", caused by *Phytophthora infestans*. *Phytophthora infestans* is not a bacterium or a virus. It belongs to a group of organisms called "protists" officially, although they are still commonly referred to as "fungi". They are also called "water moulds" because they produce spores and cause infection only when free water is present on the plants.

Late blight also occurs on potatoes, eggplant, nightshade and occasionally on peppers.

Late blight occurs in the Interior too, but "early blight" is more common in this drier region. Early blight is caused by a very different fungus called *Alternaria*. Both diseases cause leaf and stem lesions and fruit rot, so are sometimes confused.

Although they are called "early" and "late" blight, both diseases can occur at any time from spring to fall if weather conditions are favourable. Early blight generally develops at warmer temperatures than late blight, which generally prefers cool, wet weather. However, one of the new strains of late blight, US8, which only infects potatoes, appears to do well at warmer temperatures.

Q ***Does the late blight fungus infect stems as well as leaves? I saw stem lesions on my tomatoes but wasn't sure this was late blight.***

A Yes. The first symptom on tomato plants is often a brown/black lesion on the stem or petiole. Leaves develop large brown/black blotches, often starting at leaf margins. In humid weather and in early mornings, a fuzzy mould can often be seen on the underside of the brown/black blotches or on the stem lesions. This fuzzy growth contains spores of the fungus. On fruit, infection causes a brown/ black, leathery rot. It may become soft and mushy if invaded by secondary organisms.

Q ***How does late blight spread?***

A In cool, wet or humid weather the fungus produces spores called "sporangia". These spores can travel up to 20 kilometers in wind-blown rain. Rain-spread spores can cause infection even in a garden where tomatoes or potatoes have not been grown before.

Sporangia can also move in ground water, runoff or in watering splash from plant to plant in the garden. If they are contained in a water droplet which does not dry up for a few hours, they will germinate to produce other tiny spores called "zoospores" which swim through the water, attach themselves to the leaf or stem tissue and cause infection.

Some older literature may state that late blight is not a soil-borne disease, that it needs living plant tissue to survive. It is true, that when only a single mating type of *P. infestans* occurs on a plant, it does not survive in bare soil, well-rotted compost or organic mulch. However, this statement can be misleading to gardeners, since the organism can survive mild winters on small bits of un-rotted or un-frozen plant debris in the soil.

Also, the appearance of two mating types in BC has caused a new phenomenon. When two different mating types occur on the same plant the fungus can form thick-walled resting spores called "oospores" which can survive for many years in soil without living plant debris.

The two mating types are often found together on HOME GARDEN TOMATOES (see below).

Q ***Is the late blight disease worse than it used to be?***

A Yes. Every year, temperature and rainfall affect the timing and severity of late blight disease. But, in recent years, new, more aggressive strains, in combination with cool, wet summers, have led to an escalating blight problem.

Phytophthora infestans has 2 mating types: A1 and A2. When both are present on the same plant, they can recombine to form new strains, as well as oospores.

Several new strains of *P. infestans*, of both mating types, have appeared in all parts of the province in the last few years. At least two of these new strains are very aggressive. They have spread rapidly and destroy plants very quickly. One of these is called " gll" (an A1 mating type strain) and the other is called US8 (an A2 mating type). These are the most common strains now in BC and across North America. Gll infects both tomato and potato, but US8 does not infect tomato.

Genetic analysis by Dr. Zamir Punja at Simon Fraser University has shown that HOME GARDEN TOMATOES are a major source of new strains of late blight in British Columbia. This is because home garden tomatoes are often left untended and diseased plants are allowed to remain in the garden through the summer and fall. This

leads to high spore levels and more potential for recombination of the two mating types to produce new strains.

Q ***Why does the blight seem to be worse (or milder) in my garden than in my neighbour's? Or worse in one part of the garden than another?***

A Rain-spread spores can cause spotty outbreaks. Also, disease development depends on the temperature and humidity around your plants. Plants in warmer, drier, sunny spots will have less disease. For example, plants that receive the morning sun will dry off more quickly from nightly dew and fog. Plants grown in a high moisture-holding soil or planting mix will have a cooler and more humid environment which is more favourable for disease, than plants grown on a sandy soil or plastic mulch.

Q ***Are there any blight-resistant tomatoes?***

A No. Although some home gardeners report that cherry tomatoes get less disease, there is no confirmed genetic resistance to late blight in any tomato variety. Earlier-maturing varieties may escape the peak weather conditions for blight infection in years when there is a warm, dry spring and the disease does not develop until the fall.

Q ***When I bring healthy green tomatoes indoors to ripen, they often rot anyway. Why does this happen? Can it be prevented?***

A In wet weather, green fruit may have been infected already, or be carrying spores on the surface. As the fruit ripens, rot develops. Some gardeners report that washing green fruit in soap and water after picking, or dipping green fruit in a 10% bleach solution (1 part household bleach to 9 parts water) followed by a soap and water wash, reduces fruit rot during ripening.

Q ***What can I do to control late blight on my tomatoes?***

A

❶ Grow tomatoes in a warm, dry, sunny area. If you have had blight previously, move to a different area if possible, or replace the upper soil layer since "oospores" will carryover in soil.

❷ Water only underneath the plants, not the leaves or fruit. Drip irrigation is preferable to watering with a hose, to reduce water splash. Don't overfertilize or overwater.

❸ Grow on a light sandy soil if possible or cover soil with a white plastic mulch to increase soil and air temperatures around the plants and reduce humidity.

❹ Growing plants under an overhang or a clear plastic shelter will help prevent spores from being deposited on plants by wind and rain. But plants must be covered before infection has occured. Covering the plants after they are infected may raise humidity and make the disease worse.

❺ Grow the tomatoes on raised beds with well-spaced trellises or in containers off the ground. Tomatoes grown on balconies or roof-tops rarely develop late blight, probably because the environment is warmer and drier.

❻ Remove all of last year's tomato or potato debris to prevent carry over of disease.

❼ Remove diseased leaves or shoots immediately and all plants that are severely diseased. Bury them, or seal them in a plastic bag and take to a landfill. Do not compost diseased plants. If "oospores" are present, they will survive in compost.

❽ Destroy any volunteer potato or tomato plants in the garden.

❾ Destroy any nightshade weeds along fencerows. Nightshade is related to tomato and potato and is also a good host for late blight.

❿ Apply copper sprays or other home garden fungicides recommended for late blight at least once a week when weather is favourable for disease. READ THE LABEL. Copper, which is accepted by most organic producers, should be applied for prevention more than cure, that is, before the disease has become established.

GARDENERS who are unable or choose not to follow a regular fungicide spray program for late blight are strongly urged to destroy (bag or bury) all infected tomato or potato garden plants or plant parts as soon as the disease is observed. If in doubt whether it is late blight, take a sample to a local garden centre or Master Gardener for identification.

DISPOSING OF INFECTED PLANTS PROMPTLY WILL HELP THE POTATO INDUSTRY AND OTHER HOME AND MARKET GARDENERS AS WELL.

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